Technical Data Report

for

YERBA MATÉ

Ilex paraguariensis

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Yerba maté

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Family: Aquifoliaceae

Genus: *Ilex*

Species: *paraguariensis*

Synonyms: *Ilex paraguayensis , I. paraguensis, I. mate, I. domestica, I. sorbilis*

Common Names: Yerba maté, maté, erva mate, congonha, erveira, Paraguay cayi, Paraguay tea, South American holly, matéteestrauch, erva-verdadeira, St. Bartholomew's tea, Jesuit's tea, hervea, caminú, kkiro, kali chaye

Part Used: Leaves

Yerba maté is a widely-cultivated, medium-sized evergreen tree that can grow to 20 m high in the wild. Commonly, when cultivated, it is pruned into a shrubby, 4–8 m tall tree. Yerba maté is in the holly family, and bears holly-like leaves that are quite stiff and leathery. In the wild it grows near streams, and thrives at 1,500–2,000 feet above sea level. It has graceful, full-leafed branches, and white flowers that produce small red, black, or yellow berries. It is *Ilex*'s tough, leathery leaves that are used medicinally and as a natural, refreshing tea beverage throughout South America. Yerba maté is indigenous to Paraguay, Brazil, Argentina, and Uruguay; however, it is now cultivated in many tropical countries to supply a world demand for its leaves.

Yerba maté was has been used as a beverage since the time of the ancient Indians of Brazil and Paraguay. In the early 16th century, Juan de Solís, a Spanish explorer of South America's famed La Plata River, reported that the Guaraní Indians of Paraguay brewed a leaf tea that "produced exhilaration and relief from fatigue." The Spaniards tried the beverage and liked it. Their subsequent demand for the tea led the Jesuits to develop plantations of the wild species in Paraguay and yerba maté became known as "Jesuits' tea" or "Paraguay tea." Methods of leaf preparation for the traditional tea beverage vary then and now: in one method, the branches are cut, then held over an open fire (to fire-cure the leaves). This deactivates the enzymes in the leaves (making them more brittle) and the green color of the leaves is retained in the subsequent drying process (with charred bits often found in the resulting tea product, which lends to a smokey flavor). Other methods include a brief par-blanching of the leaves in boiling water (to deactivate the leaf enzymes and soften its leathery texture). They then are toasted dry in large pans over a fire or inside a brick oven—resulting in a finished brown-leaf tea.

The wild plant has a distinct aroma and taste that has not been matched by plantation cultivation. In South America yerba maté is considered a national drink in several countries; in Europe, it is called "the green gold of the Indios." In Brazil and Paraguay (leading exporters of maté), some production still comes from wild stands—most of which is found in the humid depressions of the foothills. It is not unusual for one wild tree to yield 30–40 kg of dried leaves annually. In wild harvesting, maté gatherers, called *tarrafeiros* or *yebateros,* travel through the jungle searching for a stand of trees (called a *mancha*). Harvesting is done between May and October, when the tree is in full leaf. Leaves are picked from the same tree only every third year, which protects it for subsequent crops. Most of the maté in commerce today, however, comes from cultivation projects in Paraguay and Uruguay.

The word *maté* is Spanish for "gourd," and refers to the small gourd cup in which the tea beverage traditionally is served throughout South America. It is also served with a metal drinking straw or tube, called a *bombilla*, which has a filter attached to the lower end to strain out leaf fragments. The bottom third of the gourd is filled with fire-burned or toasted leaves, and hot water is added. Burnt sugar, lemon juice, and/or milk often is used to flavor the refreshing tea, which occupies a position rivaling that of coffee in the United States. Maté bars are as prevalent in South America as coffee bars are in North America and Europe; maté drinking has deep cultural roots.

In addition to its standing as a popular beverage, yerba maté is used as a tonic, diuretic, and as a stimulant to reduce fatigue, improve appetite, and aid gastric function in herbal medicine systems throughout South America. It also has been used as a depurative (to promote cleansing and excretion of waste). In Brazil, maté is said to stimulate the nervous and muscular systems and is used for digestive problems, renal colic, neurasthenia, depression, fatigue, and obesity. A poultice of the leaves also is applied topically to anthrax skin ulcers (for which maté's tannin content—highly astringent—may be the reasoning behind this use).

Yerba maté also has a long history of use worldwide. In Europe it is used for weight loss, physical and mental fatigue, nervous depression, rheumatic pains, and psychogenic- and fatigue-related headaches. In Germany it has become popular as a weight-loss aid. Yerba maté is the subject of a German monograph which lists its approved uses for mental and physical fatigue, and describes it as having "analeptic, diuretic, positively inotropic, positively chronotropic, glycogenolytic and lipolytic effects."[1] In France yerba maté is approved for the treatment of asthenia (weakness or lack of energy), as an aid in weight-loss programs, and to increase the renal excretion of water. It also appears in the *British Herbal Phamacopoeia* (1996) and indicated for the treatment of fatigue, weight loss, and headaches. In the U.S., Dr. James Balch, M.D. recommends yerba maté for arthritis, headache, hemorrhoids, fluid retention, obesity, fatigue, stress, constipation, allergies, and hay fever, and states that it "cleanses the blood, tones the nervous system, retards aging, stimulates the mind, controls the appetite, stimulates the production of cortisone, and is believed to enhance the healing powers of other herbs." Yerba maté now is cultivated in India, and the Indian *Ayurvedic Phamacopoeia* lists maté for the treatment of psychogenic headaches, nervous depression, fatigue, and rheumatic pains.

The primary active chemical constituency of yerba maté comprises xanthine alkaloids (caffeine, theobromine, and theophylline), saponins, and 10% chlorogenic acid.[2,3] Sterols resembling ergosterol and cholesterol are also present in yerba maté, and novel saponins have been discovered in the leaf (and named *matesaponins*).[4,5] Saponins are phytochemicals with known pharmacological activities, including, as recent yerba maté research shows, stimulating the immune system.[5–7] In addition, yerba maté leaf is a rich source of vitamins, minerals, and 15 amino acids.[8]

In recent U.S. campaigns, yerba maté marketers claim that yerba maté contains no caffeine—rather, a chemical similar to caffeine called *mateine*. Mateine, they say, possesses all the benefits of caffeine and none of its negative effects (or so they would have consumers believe). Fact: yerba maté *does* contain caffeine. It has been phytochemically and scientifically identified, documented, verified, and validated to contain caffeine for many years by independent phytochemists and scientists around the world ("independent" being the operant term here). This fact continues to be confirmed by independent research every year. The caffeine content of yerba maté has been assayed to contain between .7 and 2%, with the average leaf yielding about 1% caffeine.[9] In living plants, xanthines (such as caffeine) are bound to sugars, phenols, and tannins, and are set free or unbound during the roasting and/or fermenting processes used to process yerba maté leaves, coffee beans and even cacao beans. The mateine chemical "discovered" is probably just caffeine bound to a tannin or phenol.

Caffeine Content Comparison
Common Beverage Products [9–12]

Plant Beverage	Caffeine Content	Avg. caffeine in a 6 oz beverage*
Yerba maté leaves	0.7–2%	50–100 mg
Coffee beans (*Coffea sp*)	1–2.5%	100–250 mg
Black tea (*Camellia sinensis*)	2.5–4.5%	10–60 mg
Guaraná seed *(Paullinia cupana*)	4–8%	200–400 mg
Chocolate (Cacao seed)	0.25%	13 mg

*Based on quantities used in standard preparation methods

The traditional use of yerba maté for fatigue is explained by its primary active chemical: caffeine. Caffeine is a known stimulant, even documented with the ability to enhance athletic and cognitive performance after sleep deprivation and stress.[13,14] Yerba maté's traditional use for the heart may be due to the phytochemical theophylline, also known as a pharmaceutical medication used to stimulate the heart muscle.[15] All three xanthines (theobromine, caffeine, and theophylline) have diuretic properties, which may validate the traditional use of the plant as a diuretic.[10] These substances have several other documented pharmacological actions including CNS stimulation, relaxation of smooth muscle (especially bronchial muscle), myocardial stimulation, and peripheral vasoconstriction.

Researchers in Switzerland performed a study on human subjects (in 1999) that indicated yerba maté could be beneficial as a weight-loss aid. They noticed a thermogenic effect in healthy individuals where a drop in respiratory quotient was observed—indicating a rise in the proportion of fat oxidized.[16] In another study, yerba maté was given in combination with the plants guaraná and damiana. This combination prolonged gastric emptying (which made the subjects feel "fuller" longer) and reduced body weight.[17] Clinical studies indicate yerba maté leaf inhibits lipoxygenase, an enzyme involved in inflammation and inflammatory diseases.[18-20] Yerba maté extracts also have been shown to relax smooth muscle,[21] act as a choleretic (increase bile flow),[22] and inhibit vasoconstriction.[23] A recent (2002) U.S. patent cites yerba maté for inhibiting monoamine oxidase (MAO) activity by 40–50% *in vitro*, reporting that it might be useful for a variety of such disorders as "depression, disorders of attention and focus, mood and emotional disorders, Parkinson's disease, extrapyramidal disorders, hypertension, substance abuse, eating disorders, withdrawal syndromes and the cessation of smoking." [24]

Yerba maté has significant antioxidant activity, demonstrated in numerous studies.[25-27] Its high antioxidant values are linked to rapid absorption of known antioxidant phytochemicals found in maté leaves.[28,29] An infusion (tea) of the leaf has been demonstrated to inhibit lipid peroxidation—particularly LDL (low-density lipoprotein) oxidation.[26,29] Oxidation of LDL is considered to be the initiating factor in the pathogenesis of atherosclerosis.[30,31] Another study *in vitro* has shown yerba maté to inhibit the formation of advanced glycation end products (AGEs), with an effect comparable to that of two pharmaceutical AGE inhibitor drugs.[32] The formation of AGEs play a part in the development of diabetic complications.[33]

Yerba maté has long been a part of South American culture where it is more heavily consumed than coffee and tea. The average person in Uruguay will consume 9–10 kg annually! However—like many things—too much of a good thing can be harmful. Heavy drinkers of maté in South America were documented with an increased risk of upper-aerodigestive tract cancers (a 1.6– to 4–fold increase for heavy drinkers).[34-38] It was speculated that this risk was caused by the tannins in the leaf (maté contains 7–14% tannins). Despite several studies published in Uruguay reporting this increased cancer risk (and where some of the heaviest maté drinkers are found), it has done little to change the maté-drinking culture there. One interesting change was that more drinkers began adding milk to their maté—it was suggested that the milk would bind to the tannins in the brew and mitigate much of their (possibly) negative effects.

Yerba maté has become more popular and available in the U.S. in recent years. Various maté products now can be widely found in health food stores: cut-leaf green and brown teas and tea bags, ground-leaf capsules, and standardized extracts (standardized to the caffeine content) are sold in capsules. It is also appearing as an ingredient in many more U.S.-manufactured herbal formulas designed for energy gain and weight loss. There have been some sporadic problems in product quality—mostly involving other leaves (cheaper fillers) added as adulterants. Mango leaves are a common adulterant in South America but, in at least one documented case, a yerba maté commercial product sold in Scotland was adulterated with a plant (in the belladonna family) containing pyrrolizidine alkaloids—which caused negative side-effects in one consumer. True yerba maté, however, is considered a safe supplement and on the FDA's GRAS list (generally regarded as safe). Consumers should stick with reputable manufacturers who regularly test and control their imported plant ingredients to avoid such issues as adulterants.

Documented Properties and Actions: Alterative, analeptic, analgesic, antioxidant, aperient, astringent, cardiac stimulant, choleretic, CNS stimulant, depurative, diuretic, glycogenolytic, immunostimulant, lipolytic, positively chronotropic, positively inotropic, purgative, stimulant, stomachic, sudorific, thermogenic, tonic

Main Phytochemicals: Alpha-amyrin, alpha-terpineol, arachidic acid, beta-amyrin, butyric acid, caffeic acid, caffeine, 5-o-caffeoylquinic acid, calcium, carotene, chlorogenic acid, choline, chlorophyll, chrysanthemin, cyanidin-3-o-xylosyl-glucoside, cyanidin-3-glucoside, essential oil, eugenol, geraniol, geranyl acetone, guaiacin b, indole, inositol, ionone, iso-butyric acid, iso-capronic acid, iso-chlorogenic acid, iso-valeric acid, kaempferol, lauric acid, levulose, linalool, linoleic acid, matesaponins, neochlorogenic acid, nerolidol, nicotinic acid, nudicaucin c, octan-1-ol, octanoic acid, oleic acid, palmitic acid, palmitoleic acid, pyridoxine, quercetin, raffinose, safrole, stearic acid, tannins, theobromine, theophylline, trigonelline, ursolic acid

Traditional Remedy: A leaf tea or infusion is the standard preparation, utilizing 2 g of cut leaves in 150 ml of hot water. Powdered leaf and leaf extracts with standardized caffeine content are being used in capsules and formulas in herbal products as well. General dosages recommended are the equivalent of 3 g once or twice daily, or follow the labeled dosage information.

Contraindications: Not to be used during pregnancy or while breast-feeding.

Yerba maté contains caffeine and should not be used by those who are sensitive or allergic to caffeine. Excessive consumption of caffeine is contraindicated for persons with high blood pressure, diabetes, ulcers, and other diseases.

Yerba maté should not be consumed excessively and chronically (as it has been documented to increase the risk of certain such cancers as oral and esophageal cancer).

Yerba maté has been reported to have (*in vitro*) MAO-inhibitor activity. Those persons taking MAO-inhibitor drugs, or with conditions for which MAO-inhibitor drugs are contraindicated, should check with a qualified health practitioner before taking yerba maté.

Drug Interactions: May potentiate monoamine oxidase inhibitor drugs (MAOIs).

WORLDWIDE ETHNOBOTANICAL USES

Country	Uses
Brazil	Anthrax ulcers (topical), appetite, asthenia, beverage, CNS stimulant, digestion, diuretic, fatigue, gastric stimulant, heart, hypertension, muscles, nervous system stimulant, neurasthenia, obesity, renal colic, rheumatism, stimulant, stomachic, tea, tonic, urinary
Europe	Antirheumatic, antispasmodic, asthenia, (+)chonotropic, CNS stimulant, depression, diuretic, fatigue, gout, glycogenolytic, headache, (+)inotropic, lipolytic, obesity, tonic, thymoleptic, ulcer, weight loss
India	Fatigue, headache, nervous depression, rheumatic pains
South America	Analeptic, antispasmodic, appetite suppressant, aperient, astringent, beverage, coffee, debility, diaphoretic, diuretic, emmenogogue, energizer, exhaustion, fatigue, gout, headache, inotropic, muscles, neurasthenia, obesity, purgative, rheumatism, scurvy, stimulant, stress, tonic, wound
Turkey	Diuretic, purgative, scurvy, stimulant, sudorific, tea
U.S.	Allergies, aging, appetite, arthritis, cardiotonic, constipation, depurative, diuretic, edema, endurance, fatigue, hayfever, headache, hemorrhoids, nervous system, obesity, stamina, stimulant, stress, tonic
Elsewhere	Cardiotonic, diuretic, fatigue, stimulant, tonic

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Ethnomedical Information on Yerba maté (Ilex paraguariensis)

Part / Location	Documented Ethnomedical Use	Type Extract / Route	Used For	Ref #
Leaf Argentina	Used for scurvy, as an energizer and tonic.	Infusion Oral	Human Adult	ZZ1061
Leaf Bolivia	Used as an emmenagogue.	Hot H2O Ext Oral	Human Female	T15375
Leaf Brazil	Used as an antirheumatic.	Infusion Oral	Human Adult	H15715
Leaf Brazil	Used as a diuretic.	Infusion Oral	Human Adult	H15715
Leaf Brazil	Used as a stimulant.	Infusion Oral	Human Adult	H15715
Leaf Brazil	Used as a beverage.	Hot H2O Ext Oral	Human Adult	M22370
Leaf Brazil	Used as a nervous system stimulant.	Hot H2O Ext Oral	Human Adult	M22370
Leaf Brazil	Used as a diuretic.	Hot H2O Ext Oral	Human Adult	M22370
Leaf Brazil	Used as a antirheumatic.	Hot H2O Ext Oral	Human Adult	M22370
Leaf Brazil	Used as a tonic, stimulant and diuretic to reduce fatigue, improve appetite and aid gastric function.	Hot H2O Ext Oral	Human Adult	ZZ1080
Leaf Brazil	Used to stimulate the central nervous system, stomach, the digestive system and muscles. Said to be a diuretic.	Infusion Oral	Human Adult	ZZ1088
Leaf Brazil	Used as a stimulant, diuretic and digestive for stimulating the nervous and muscular systems, digestive problems, renal colic, neurasthenia, depression of the nervous system, tiredness and to excite and facilitate intellectual work.	Infusion Oral	Human Adult	ZZ1007
Leaf Brazil	May cause stomach irritation. Used to excite the nervous system, for energy and to reduce arterial tension.	Infusion Oral	Human Adult	ZZ1079
Leaf Brazil	Used for weak people, for urinary affections, for heart disorders, tiredness and obesity.	Infusion Oral	Human Adult	ZZ1013
Leaf Brazil	Used as a stimulating beverage and slimming remedy. Used for anthrax and ulcers.	Hot H2O Ext Oral Poultice External	Human Adult Human Adult	ZZ1000
Leaf Europe	Used for weight loss, physical and mental fatigue, nervous depression, rheumatic pains, psychogenic and fatigue related headaches.	Hot H2O Ext Oral	Human Adult	AB1054

Part / Location	Documented Ethnomedical Use	Type Extract / Route	Used For	Ref #
Leaf France	Used to treat functional asthenia, for weight loss programs and to enhance the renal excretion of water.	Not Stated Oral	Human Adult	ZZ1048
Leaf Germany	Approved herbal drug for mental and physical fatigue and described as having"analeptic, diuretic, positively inotropic, positively chronotropic, glycogenolytic and lipolytic effects.	Hot H2O Ext Oral	Human Adult	AB1055
Leaf Peru	Used as a stimulant for the stomach and nervous system, for tiredness. Considered cicatrizant; used on wounds.	Infusion Oral Not stated External	Human Adult	ZZ1093
Leaf Peru	Used as a tonic.	ETOH Ext Oral	Human Adult	ZZ1093
Leaf South America	Used as a stimulant. Affects the muscles, reducing fatigue. Substitutes for alcoholic drinks and is used for those suffering from debility and neurasthenia. Said to dispel hunger and invigorate the body.	Hot H2O Ext Oral	Human Adult	ZZ1049
Leaf South America	Said to be aperient, astringent, diuretic, poison, purgative, stimulant and sudorific. Used for rheumatism, scurvy, heart, nerve, stomach ailments and diabetes.	Hot H2O Ext Oral	Human Adult	ZZ1049
Leaf South America	Used to stimulate the brain and nervous system, as an antirheumatic, diuretic, general tonic and antispasmodic. Used for gout, to eliminate uric acid, rheumatism, nervous headache and physical exhaustion from stress.	Infusion Oral	Human Adult	ZZ1011
Leaf South America	Used for mental and physical fatigue. Considered to be analeptic, positively inotropic, positively chronotropic, glycogenolytic and lipolytic.	Infusion Oral	Human Adult	AB1001
Leaf South America	Used as a nerve and muscle tonic, considered refreshing and a diuretic. Said to never cause insomnia despite its caffeine content.	Infusion Oral	Human Adult	ZZ1066
Leaf South America	Used to facilitate weight loss and still hunger and thirst.	Infusion Oral	Human Adult	AB1001
Leaf South America	Used as a tonic, diuretic, diaphoretic and stimulant. May causes purging and vomiting in large doses.	Infusion Oral	Human Adult	ZZ1052
Leaf South America	Used as a depurative, stimulant and diuretic. Often replaces coffee and tea as a common beverage.	Infusion Oral	Human Adult	AB1002
Leaf South America	Used as a depurative to promote cleansing and excretion of waste; as a stimulant and diuretic.	Infusion Oral	Human Adult	AB1003

Part / Location	Documented Ethnomedical Use	Type Extract / Route	Used For	Ref #
Leaf Uruguay	Used as a stimulant.	Not Stated Oral	Human Adult	K18125
Leaf Uruguay	Used as a diuretic.	Not Stated Oral	Human Adult	K18125
Leaf Uruguay	Used to treat wounds.	Not Stated External	Human Adult	K18125
Leaf Uruguay	Used as a stimulant tea.	Hot H2O Ext Oral	Human Adult	M14337
Leaf USA	Used for arthritis, headache, hemorrhoids, fluid retention, obesity, fatigue, stress, constipation, allergies and hayfever. Said to cleanse the blood, tone the nervous system, retard aging, stimulate the mind and control appetite.	Hot H2O Ext Oral	Human Adult	ZZ1046
Leaf USA	Used as a tonic, mental stimulant and diuretic, to increase stamina and endurance. Said to be an invigorating tonic to the body and mind.	ETOH Ext Oral	Human Adult	ZZ1016
Leaf Not Stated	Used as a central nervous system stimulant	Hot H2O Ext Oral	Human Adult	L00715
Seed Not Stated	Used as a stimulant	Hot H2O Ext Oral	Human Adult	K04641

Presence of Compounds in Yerba maté (Ilex paraguariensis)

Compound	Chemical type	Plant Part	Plant Origin	Quantity	Ref #
Amyrin, alpha:	Triterpene	Leaf Leaf	Argentina Argentina	Not stated 00.43%	A07583 A06284
Amyrin, beta:	Triterpene	Leaf	Not stated	Not stated	ZZ1095
Arachidic acid	Lipid	Seed oil	Not stated	Not stated	AB1003
Butyric acid	Phenylpropanoid	Leaf	Not stated	Not stated	ZZ1095
Butyric acid, iso	Phenylpropanoid	Leaf	Not stated	Not stated	ZZ1095
Caffeic acid	Phenylpropanoid	Leaf Leaf	Brazil Argentina	Not stated Not stated	J17002 L21204
Caffeine	Alkaloid	Leaf Leaf Leaf Leaf Leaf Leaf Leaf Leaf Leaf Leaf Bark Wood Fruit Leaf Leaf Leaf Leaf Leaf Leaf Leaf	Brazil Brazil Brazil Brazil Uruguay Not stated Argentina Not stated Brazil Brazil Brazil Brazil Brazil Japan Not stated Not stated Brazil Brazil Brazil Brazil	Not stated Not stated Not stated Not stated 00.56% 00.78-01.25% 01.92% Not stated 0.89-1.73% Not stated Not stated Not stated Not stated 0.88% Not stated Not stated Not stated Not stated Not stated Not stated	A06260 J16308 L04728 L17706 M14337 M10672 J16175 L10990 M22406 J17002 J16308 J16308 J16308 M10333 L00715 A05062 L10422 L10422 L20331 L20331
Capronic acid, iso	Phenylpropanoid	Leaf	Not stated	Not stated	ZZ1095
Carotene	Vitamin	Not stated	Not stated	Not stated	AB1003

Compound	Chemical type	Plant Part	Plant Origin	Quantity	Ref #
Chlorogenic acid	Phenylpropanoid	Leaf Leaf Leaf	Brazil Argentina Argentina	10% Not stated Not stated	J17002 K12102 L21204
Chlorogenic acid a, iso:	Phenylpropanoid	Leaf	Brazil	Not stated	M22406
Chlorogenic acid, neo:	Phenylpropanoid	Leaf	Brazil	Not stated	M22406
Choline	Alkaloid-misc	Leaf	Brazil	00.00152%	A06278
Chrysanthemin	Flavonoid	Leaf	Argentina	Not stated	J12777
Cyanidin-3-o-xylosyl- glucoside	Flavonoid	Leaf	Argentina	Not stated	J12777
Cyanidin-3-glucoside	Flavonoid	Leaf	Not stated	Not stated	AB1002
Eugenol	Phenylpropanoid	Leaf	Brazil	Not stated	K09934
Geraniol	Monoterpene	Leaf	Brazil	Not stated	K09934
Geranyl acetone	Sesquiterpene	Leaf	Brazil	Not stated	K09934
Guaiacin b	Triterpene	Leaf	Argentina	Not stated	L13331
Indole	Indole alkaloid	Leaf	Brazil	Not stated	K09934
Ionone, alpha:	Sesquiterpene	Leaf	Brazil	Not stated	K09934
Ionone, beta:	Sesquiterpene	Leaf	Brazil	Not stated	K09934
Kaempferol	Flavonol	Leaf Leaf	Argentina Brazil	Not stated Not stated	L21204 L14356
Lauric acid	Lipid	Seed Oil	Not stated	Not stated	AB1003
Levulose	Carbohydrate	Leaf	Brazil	00.16%	A01929
Linalool	Monoterpene	Leaf	Brazil	Not stated	K09934
Linoleic acid	Lipid	Seed Oil	Not stated	Not stated	AB1003

Compound	Chemical type	Plant Part	Plant Origin	Quantity	Ref #
Mandelonitrile, 2-beta-d-glucopyranosyl-oxy-para-hydroxy-6-7-dihydro:	Benzenoid	Leaf Leaf	Not stated Not stated	00.02% 00.02%	M20926 M20926
Matesaponin 1	Triterpene	Leaf	Argentina	Not stated	L13331
Matesaponin 2	Triterpene	Leaf Leaf	Brazil Argentina	00.0135% Not stated	H15715 L13331
Matesaponin 3	Triterpene	Leaf	Brazil	00.01%	H15715
Matesaponin 4	Triterpene	Leaf	Brazil	00.019%	H15715
Matesaponin 5	Triterpene	Leaf	Brazil	00.04587%	H18558
Matesaponin I	Triterpene	Leaf	Brazil	00.03%	M22370
Nerolidol	Sesquiterpene	Leaf	Brazil	Not stated	K09934
Nudicaucin c	Triterpene	Leaf	Argentina	Not stated	L13331
Octan-1-ol	Alkanol c5 or more	Leaf	Brazil	Not stated	K09934
Octanoic acid	Lipid	Leaf	Brazil	Not stated	K09934
Quercetin	Flavonol	Leaf	Argentina	Not stated	L21204
Quinic acid, 5-o-caffeoyl-	Phenylpropanoid	Not stated	Not stated	Not stated	AB1001
Raffinose	Carbohydrate	Leaf	Brazil	00.44%	A01929
Rutin	Flavonol	Leaf	Argentina	Not stated	L21204
Safrole	Phenylpropanoid	Leaf	Brazil	Not stated	K09934
Stearic acid	Lipid	Seed Oil	Not stated	Not stated	AB1003
Terpineol, alpha:	Monoterpene	Leaf	Brazil	Not stated	K09934

Compound	Chemical type	Plant Part	Plant Origin	Quantity	Ref #
Theobromine	Alkaloid	Leaf Leaf Leaf Leaf Leaf Leaf Leaf Leaf Bark Wood Fruit Leaf Leaf Leaf Leaf Leaf Leaf	Not stated Brazil Brazil Brazil Brazil Uruguay Not stated Argentina Brazil Brazil Brazil Japan Not stated Brazil Brazil Brazil Brazil	Not stated 00.45-0.88% Not stated Not stated Not stated 00.03% 00.34-00.43% 00.484% Not stated Not stated Not stated 0.08% Not stated Not stated Not stated Not stated Not stated	L10990 M22406 J16308 L04728 L17706 M14337 M10672 J16175 J16308 J16308 J16308 M10333 A05062 L10422 L10422 L20331 L20331
Theophylline	Alkaloid	Leaf Leaf Leaf Leaf	Brazil Brazil Uruguay Not stated	Not stated Not stated 00.02% Not stated	J16308 L04728 M14337 A05062
Trigonelline	Proteid	Leaf	Brazil	00.0274%	A06260
Ursolic acid	Triterpene	Leaf Leaf	Argentina Argentina	Not stated Not stated	A07583 A06284
Valeric acid, iso		Leaf	Not stated	Not stated	ZZ1095
Xyenol, 2,5-		Leaf	Not stated	Not stated	ZZ1095
Zinc		Not stated	Not stated	Not stated	AB1007

Biological Activities for Extracts of Yerba maté (Ilex paraguariensis)

Plant Part - Origin	Activity Tested For	Type Extract	Test Model	Dosage	Result	Notes/Organism tested	Ref #
Leaf Scotland	Death	Hot H2O Ext	Oral Human	Not stated	Active	26 yr old woman taking "mate" tea presented symptoms of abdominal pain & liver function tests abnormal. 3 weeks after admission to hospital died - poor evidence of plant identification most probable cause of illness rather than the herb tea.	A07774
Not Stated Chile	Binding Effect	Infusion	Not stated	Not stated	Active	Binds minerals such as iron, zinc and copper.	AB1020
Leaf Uruguay	Cancer-associated Risk Factor	Infusion	Oral Human	Not stated	Equivocal	Drinking very hot mate may increase risk of oral and esophageal cancers. Increases risk factor to 1.6-fold in heavy chronic drinkers.	18335
Leaf Argentina	Carcinogenic Activity	Infusion	Oral Human	>1.0 L/day	Equivocal	Data analyzed from 830 cases and 1,779 controls participating in a series of 5 hospital-based case control studies of squamous-cell carcinoma of the esophagus conducted in high-risk areas of South America. After adjusting for the strong effects of tobacco and alcohol consumption both heavy maté drinking (>11/day) and self-reported very hot mate drinking were signifi-cantly associated with esophageal cancer risk in men and women.	E00552
Leaf Brazil	Carcinogenic Activity	Hot H2O Ext	Oral Human	Not stated	Active	Associated with increased incidence of upper GI cancers.	M30494
Leaf Uruguay	Carcinogenic Activity	Infusion	Oral Human	Not stated	Active	3-fold increased risk of renal cell carcinoma for heavy drinkers.	AB1013
Leaf Uruguay	Carcinogenic Activity	Infusion	Oral Human	Not stated	Inactive	Pulmonary adenocarcinoma.	AB1015
Leaf Brazil	Carcinogenic Activity	Infusion	Oral Human	Not stated	Active	May be linked to 20% of all upper aerodigestive tract cancers in Southern Brazil.	AB1016

Plant Part - Origin	Activity Tested For	Type Extract	Test Model	Dosage	Result	Notes/Organism tested	Ref #
Leaf Uruguay	Carcinogenic Activity	Infusion	Oral Human	Not stated	Active	Increased rate of bladder cancer seen.	AB1017
Leaf Uruguay	Carcinogenic Activity	Infusion	Oral Human	Not stated	Active	Increased rate of oropharyngeal cancer.	AB1018
Leaf Uruguay	Carcinogenic Activity	Infusion	Oral Human	Not stated	Active	Esophageal cancer; 6.5 increased rate for males; 34.6 increased rate for females.	AB1019
Leaf Brazil	Chromosome Aberrations Induced	MEOH Ext	Cell Culture	10.0 mg	Equivocal	Lymphocytes-human.	L14998
Leaf Brazil	Chromosome Aberrations Induced	MEOH Ext	Intragastric Rat Fetus	1.0 gm/kg	Active	Cells-bone marrow.	L14998
Leaf Brazil	Clastogenic Activity	MEOH Ext	Cell Culture	10.0 mg/ml	Equivocal	Lymphocytes-human.	L14998
Leaf Brazil	Genotoxicity Activity	Lyophilized Extract	Agar Plate	150.0 mg	Inactive	*Escherichia coli*	L14998
Leaf Brazil	Genotoxicity Activity	Pollen	Agar Plate	10.0 mg	Active	*Escherichia coli* wp2s(lambda).	K29976
Leaf Brazil	Mutagenic Activity	Lyophilized Extract	Agar Plate	10.0 mg	Equivocal	*Salmonella typhimurium* ta100.	L14998
Leaf Brazil	Mutagenic Activity	Lyophilized Extract	Agar Plate	10.0 mg	Equivocal	*Salmonella typhimurium* ta102.	L14998
Leaf Brazil	Mutagenic Activity	Pollen	Agar Plate	20.0 mg	Active	*Salmonella typhimurium* ta100.	K29976
Leaf Brazil	Mutagenic Activity	Pollen	Agar Plate	30.0 mg	Active	*Salmonella typhimurium* ta102.	K29976
Leaf Brazil	Mutagenic Activity	Pollen	Agar Plate	30.0 mg	Active	*Salmonella typhimurium* ta97.	K29976
Leaf Brazil	Mutagenic Activity	Pollen	Agar Plate	50.0 mg	Active	*Salmonella typhimurium* ta98.	K29976
Leaf Not Stated	Monamine Oxidase Inhibition	H2O-ETOH Ext	Not stated	10 mg/ml	Active	Inhibited MAO activity by 40-50%; effective in inhibiting both MAO A and MAO B.	AB1022
Leaf Paraguay	Thermogenic Activity	Leaves	Oral Human	IC100 .5 gm	Inactive Active	Non-obese women and men. No significant increase in energy expenditure noted after treatment. Drop in respiratory quotient observed, indicating a rise in the proportion of fat oxidized.	L05756
Not Stated	Thermogenic Activity	Not Stated	Oral Human	Not stated	Inactive		T15449

Plant Part - Origin	Activity Tested For	Type Extract	Test Model	Dosage	Result	Notes/Organism tested	Ref #
Leaf Denmark	Thermogenic Activity	Not stated	Oral Human	Not stated	Active	In combination with Guarana and Damiana it prolonged gastric emptying time, reduced body weight and maintained weight over 12 months.	AB1010
Leaf Not Stated	Appetite Suppressant	Toothpaste	Not stated	1-2%	Active	In combination with other plants; a patent on a novel appetite suppressant toothpaste.	AB1023
Leaf Argentina	Lipid Peroxide Formation Inhibition	Infusion	Cell Culture	IC50=100.0 mcg/ml	Active	vs. H2O2-induced peroxidation	L07251
Leaf Argentina	Lipid Peroxide Formation Inhibition	Infusion	Cell Culture Microsomes-rat-liver	IC50=18.0 mcg/ml	Active	vs. CL4C/NADPH-induced lipid peroxidation.	L07251
Leaf Argentina	Lipid Peroxide Formation Inhibition	Infusion	Cell Culture Microsomes-rat-liver	IC50 28.0 mcg/ml	Active	vs. nonenzymatic lipid peroxidation stimulated by Fe2+/a scorbate.	L07251
Leaf Not stated	LDL Oxidative Modification Inhibition	H2O Ext	Not stated	37.5 mcg/ml	Active	vs. hydrogen peroxide induced LDL oxidation.	K18723
Leaf Not stated	LDL Oxidative Modification Inhibition	H2O Ext	Not stated	MIC=7.5 mcg/ml	Active	vs. cuso4 induced LDL oxidation. Inhibition is complete at 37.5 mcg/ml.	K18723
Leaf Argentina	Antioxidant Activity	H2O Ext	Not stated	30%	Active	vs. liposome oxidation AAPH.	L11901
Leaf Argentina	Antioxidant Activity	Infusion	Not stated	100.0 mcg/ml	Inactive	vs. hydroxyl radical.	L07251
Leaf Argentina	Antioxidant Activity	Infusion	Not stated	IC50=13.0 mcg/ml	Active	vs. DPPH. Superoxide scavenging activity increase.	L07251
Leaf Not stated	Antioxidant Activity	Infusion	Oral Human	500.0 ml	Active	Inhibited LDL oxidation in blood plasma. Whole plasma subjected to copper-induced oxidation.	K29485
Leaf Canada	Antioxidant Activity	H2O Ext	Oral Human	500.0 ml	Active	vs. Cu-induced LDL autoxidation.	J16235
Leaf Argentina	Antioxidant Activity	Infusion	*In vitro*	Not stated	Active	Inhibition of TRAP, TBARS and protection of Jurkat cells from AMVN-induced oxidation.	AB1009
Leaf Argentina	Radical Scavenging Effect	H2O Ext	Not stated	5%	Active	vs. TBARS.	L11901

Plant Part - Origin	Activity Tested For	Type Extract	Test Model	Dosage	Result	Notes/Organism tested	Ref #
Leaf USA	Antiglycation Activity	Not stated	*In vitro*	Not stated	Active	Inhibition of the action of the dicarbonyl; comparable to using millimolar concentrations of known AGE inhibitors aminoguanidine and carnosine.	AB1008
Leaf Paraguay	Lipoxygenase Inhibition	H2O Ext	Cell Culture	10.0 mcg/ml	Active	Cells-RBL-1	L11790
Leaf Paraguay	Lipoxygenase Inhibition	MEOH Ext	Cell Culture	10.0 mcg/ml	Active	Cells-RBL-1	L11790
Leaf Paraguay	Lipoxygenase Inhibition	Alkaloid Free H2O Extract	Cells-RBL-1	10.0 mcg/ml	Active	vs. epinephrine-induced hyperglycemia.	L11790
Leaf Paraguay	Lipoxygenase Inhibition	Benzene Ext	Cell Culture	10.0 mcg/ml	Inactive	Cells-RBL-1	L11790
Leaf Not stated	Anti-inflammatory Activity	MEOH Ext	External Mouse	2.0 mg	Active	Inhibition ratio=69%. vs.12-o-tetradecanoylphorbol-13-acet-ate (TPA)-induced ear inflammation.	K11173
Leaf Not stated	Antibacterial Activity	ETOH(95%) Ext	Agar Plate	Not stated	Inactive	*Escherichia coli*	A15179
Leaf Not stated	Antibacterial Activity	ETOH(95%) Ext	Agar Plate	Not stated	Inactive	*Staphylococcus aureus*	A15179
Leaf Not stated	Antibacterial Activity	H2O Ext	Agar Plate	Not stated	Inactive	*Escherichia coli*	A15179
Leaf Not stated	Antibacterial Activity	H2O Ext	Agar Plate	Not stated	Inactive	*Staphylococcus aureus*	A15179
Leaf Not stated	Antimycobacterial Activity	ETOH(95%) Ext	Agar Plate	Not stated	Inactive	*Mycobacterium tuberculosis*	A15179
Leaf Not stated	Antimycobacterial Activity	H2O Ext	Agar Plate	Not stated	Inactive	*Mycobacterium tuberculosis*	A15179
Leaf Not stated	Antiviral Activity	H2O Ext	Cell Culture	10.0%	Inactive	*Virus-herpes type 2.*	T09507
Leaf Not stated	Antiviral Activity	H2O Ext	Cell Culture	10.0%	Inactive	*Virus-influenza 2* (manheim 57).	T09507
Leaf Not stated	Antiviral Activity	H2O Ext	Cell Culture	10.0%	Inactive	*Virus-poliovirus*.	T09507
Leaf Not stated	Antiviral Activity	H2O Ext	Cell Culture	10.0%	Inactive	*Virus-vaccinia.*	T09507
Not stated Japan	Smooth Muscle Relaxant Activity	Butanol Ext	Guinea Pig Atrium	3.0 mcg/ml	Equivocal	vs. KCl-induced contractions.	J19977
Not stated Japan	Smooth Muscle Relaxant Activity	Butanol Ext	Rabbit Aorta	3.0 mcg/ml	Equivocal	vs. KCl-induced contractions.	J19977

Plant Part - Origin	Activity Tested For	Type Extract	Test Model	Dosage	Result	Notes/Organism tested	Ref #
Leaf Japan	Smooth Muscle Relaxant Activity	Butanol Ext	Rabbit Aorta	3.0 mcg/ml	Equivocal	vs. norepinephrine-induced contractions	J19977
Leaf Japan	Smooth Muscle Relaxant Activity	ETOAC Ext	Guinea Pig Atrium	3.0 mcg/ml	Equivocal	vs. KCl-induced contractions.	J19977
Leaf Japan	Smooth Muscle Relaxant Activity	ETOAC Ext	Rabbit Aorta	3.0 mcg/ml	Active	vs. KCl-induced contractions. vs. norepinephrine-induced contractions.	J19977
Leaf Japan	Smooth Muscle Relaxant Activity	H2O Ext	Guinea Pig Atrium	3.0 mcg/ml	Equivocal	vs. KCl-induced contractions.	J19977
Leaf Japan	Smooth Muscle Relaxant Activity	H2O Ext	Rabbit Aorta	3.0 mcg/ml	Equivocal	vs. KCl-induced contractions. vs. norepinephrine-induced contractions.	J19977
Leaf Brazil	Vasoconstriction Inhibition	H2O Ext	Organ Culture	600.0 mcg/ml	Active	vs. methoxamine-induced contractions in mesenteric arterial bed.	L05460
Leaf Not stated	Cytotoxic Activity	H2O Ext	Cell Culture	10.0%	Acive	HeLa cells.	T09507
Leaf Not stated	Antitumor Activity	H2O Ext	IP Mouse	Not stated	Active	Ca-755.	K18283
Leaf Uruguay	Anticrustacean Activity	Hot H2O Ext	Not stated	1.0%	Inactive	*Artemia salina* (Assay system is intended to predict for antitumor activity.)	K18125
Leaf Argentina	Cholagogue Activity	Decoction	Not stated	Not stated	Active	Increased bile flow and enhanced intestinal transit.	AB1011
Leaf Brazil	Hyaluronidase Inhibition	Hot H2O Ext	Not stated	0.01%	Weak Activity	60% inhibition.	A00401
Leaf Uruguay	Plant Root Growth Inhibition	Hot H2O Ext	Not stated	5.0%	Active	Assayed in *Triticum aestivum*.	K18125
Leaf Uruguay	Plant Root Growth Stimulant	Hot H2O Ext	Not stated	0.5%	Active	Assayed in *Triticum aestivum*.	K18125
Leaf Not stated	Cosmetic Effect	Resin	Not stated	0.2-10 g	Active	Produces a stable protective film on the skin. Intensifies color, increases luster, contributes to good wet compatibility and improves the elasticity of the hair.	AB1021

Biological Activities for Compounds of Yerba maté (Ilex paraguariensis)

(Please note: The following is just a representation of some of the published research on compounds in yerba maté.)

Compound Tested	Activity Tested For	Test Model	Dosage	Result	Notes/Organism tested	Ref #
Caffeine	Toxicity (in utero)	Oral Rat	0.02% drinking water	Active	In utero exposure affects central respiratory control - higher respiratory frequency and hypoxic respiratory depression seen.	AB1030
Theophylline	Mutagenic Activity	Not stated	Not stated	Inactive	*Salmonella typhimurium.*	AB1046
Caffeine	Stimulant	Not stated	Not stated	Active	Stimulates the central nervous system; increases the activity of the heart.	AB1004
Caffeine	Athletic Performance Activity	Oral Human Adult	250 mg	Inactive Active Active	Short-term performance. Blood lactate increased. Plasma insulin concentrations at rest, end of mock test and during recovery were increased.	AB1035
Caffeine	Cognitive Performance	Oral Human Adult	200 mg 300 mg	Active Active	Subjects received caffeine after 72 hrs of sleep deprivation and continuous exposure to stressors. Caffeine improved visual vigilance, choice reaction time, repeated acquisition, self-reported fatigue and sleepiness. Improved results on tests of vigilance, reaction time and alertness.	AB1036
Caffeine	Cognitive Performance	Oral Human Adult	1 or 2 mg/kg followed 60 minutes later with 1 mg/kg	Active Inactive	Improved performance on a sustained attention task and increased mental alertness in caffeine-deprived consumers. No effect on rated mental alertness and performance on an attention task in consumers who were not caffeine deprived.	AB1037
Caffeine	Cognitive Performance	IP Rat	0.3-10 mg/kg 30 mg/kg 0.3-30 mg/kg	Active Inactive Active	Post-training dose improved memory retention. Post-training memory retention. Pre-test dose increased memory retrieval.	AB1038
Caffeine	Cognitive Performance	Oral Human Adult	200 mg	Active	Increased alertness and anxiety and improved performance on simple and choice reactive tasks, a cognitive vigilance task, a task requiring sustained response and a dual task involving tracking and target detection.	AB1039

Compound Tested	Activity Tested For	Test Model	Dosage	Result	Notes/Organism tested	Ref #
Caffeic acid	Antidepressant Activity	IP Mice	10 x (-9) - 10 x (-3) M	Active	Mechanism by some other inhibition of monoamine transporters and monoamine oxidase.	AB1027
Theobromine	Diuretic	Not stated	Not stated	Active		AB1004
Caffeine	Diuretic	Not stated	Not stated	Active		AB1004
Theophylline	Diuretic	Not stated	Not stated	Active		AB1004
Theobromine	Antispasmodic Activity	Not stated	Not stated	Active	Smooth muscle.	AB1004
Theophylline	Antispasmodic Activity	Not stated	Not stated	Active	Smooth muscle	AB1004
Theophylline	Antispasmodic Activity	Not stated	Not stated	Active	Relaxed the smooth muscles of the bronchi and blood vessels.	AB1046
Caffeic acid	Motor Activity	IP Mice	4 mg/kg	Active	Reduced the duration of immobility in the forced swimming test.	AB1027
Theophylline	Bronchodilator Activity	Not stated	Not stated	Active	Used for conditions such as obstructive airway disease and bronchial asthma.	AB1046
Theophylline	Respiratory Activity	Not stated	Not stated	Active	Modest effect on FEV1 and FVC and slightly improved arterial blood gas tensions in COPD.	AB1047
Alpha-amyrin	Anti-inflammatory Activity	Rat	Not stated	Inactive	No effect on the prostaglandin phase of carrageenin pedal edema in rats.	AB1024
Beta-amyrin	Anti-inflammatory Activity	*In vitro*	Not stated	Active Inactive	Reduced 5-HETE synthesis. LTB4 synthesis.	AB1025
Caffeic acid	Anti-inflammatory Activity	Cell Culture (human monocytes)	Not stated	Active	Inhibited LPS-induced TNF-alpha release at a low dose.	AB1026
Caffeine	Anti-inflammatory Activity	Cell Culture	5 x 10(-6) - 1.5 x 10(-4) mol/l	Inactive	No significant effect on endotoxin-induced PGE(2) formation nor on its inhibition by indometacin.	AB1029
Ursolic acid	Anti-inflammatory Activity	Mice	ID50=0.14 microMoles/cm2	Active	Vs. croton oil-induced ear edema. Two-fold more potent than indomethacin.	AB1053
Alpha-amyrin	Anti-arthritic Activity	Not stated	Not stated	Active	Local inhibition of joint destruction.	AB1024
Alpha-amyrin	Cytotoxic Activity	Cell Culture	IC50=14 microM	Active	Rat osteosarcoma cell.	AB1024

Compound Tested	Activity Tested For	Test Model	Dosage	Result	Notes/Organism tested	Ref #
Caffeine	Cytotoxic Activity	Topical Mice	Not stated	Active	Inhibited carcinogenesis and stimulated apoptosis of skin tumors. Decreased size of parametrial fat pads and the thickness of the dermal fat layer.	AB1028
Chlorogenic acid	Cytotoxic Activity	Cell Culture	Not stated	Active Active	Human oral squamous cell carcinoma (HSC-2). Salivary gland tumor (HSG).	AB1041
Geraniol	Cytotoxic Activity	Cell Culture	400 microM	Active	Sensitized colon cancer cells to 5-FU treatment, increasing the antiproliferative and cytotoxic activity of the drug.	AB1044
Ursolic acid	Cytotoxic Activity	Cell Culture	IC50=8.26 mumol/L 10-50 mumol/L	Active Active	HL-60 cells. Apoptosis of HL-60 cells induced.	AB1050
Ursolic acid	Antitumor Activity	Cell Culture	Not stated	Active	Increased nitric oxide and TNF-alpha production.	AB1051
Ursolic acid	Antitumor Activity	Cell Culture	Not stated	Active	Induced apoptosis and interfered with enzymes involved in DNA synthesis. Prevented malignant transformation of normal cells.	AB1052
Geraniol	Antiproliferative Activity	Cell Culture	400 microM	Active Active	70% inhibition of human colon cancer cell line (Caco-2). 50% decrease of ornithine decarboxylase activity.	AB1045
Caffeine	Cardiovascular Activity	Oral Human Adult (hyperten-sive)	250 mg	Active	Systolic blood pressure and pulse pressure increased; no change in diastolic blood pressure; an increase in aortic stiffness seen.	AB1031
Caffeine	Cardiovascular Activity	Oral Human Adult	870 mg	Active	Increased fasting homocysteine by 0.4 micromol/L or 5%. Effect was stronger in women.	AB1034
Theophylline	Cardiovascular Activity	Not stated	Not stated	Active	Used for myocardial stimulation.	AB1046
Chlorogenic acid	Hypocholesterolemic Activity	IV Rat	5 mg/kg	Active	Decreased fasting plasma cholesterol (44%), triacylglycerols (58%) and liver triacylglyerols concentrations (24%).	AB1040
Caffeine	Osteoporotic Activity	Oral Human Adult Female	200-300 mg (2.5-6 fl oz cups)	Active	Associated with a loss of bone mineral density in most skeletal sites. Attenuated with a higher calcium intake (750 mg/day).	AB1032

Compound Tested	Activity Tested For	Test Model	Dosage	Result	Notes/Organism tested	Ref #
Chlorogenic acid	Hypoglycemic Activity	IV Rat	5 mg/kg	Inactive Active	Did not promote sustained hypoglycemia. Lowered postprandial peak response to glucose challenge.	AB1040
Eugenol	Antiestrogenic Activity	*In vitro*	Not stated	Active		AB1042
Geraniol	Estrogenic Activity	*In vitro* Mice	Not stated Not stated	Active Inactive		AB1042
Eugenol	Antibacterial Activity	Agar Plate	BA50=0.003-0.034 BA50=0.019-0.43 BA50=0.034-0.21	Active Active Active	*C. jejuni* *L. monocytogenes* *S. enterica*	AB1043
Geraniol	Antibacterial Activity	Agar Plate	BA50=0.057-0.28 BA50=0.019-0.43 BA50=0.034-0.21	Active Active Active	*E. coli* *L. monocytogenes* *S. enterica*	AB1043
Ursolic acid	Antitrypanocidal Activity	*In vitro*	MC100=40 micro g/ml	Active	*T. cruzi*	AB1049
Saponin Fraction	Complex Formation	Not stated	21 gm/L	Active	Reduced passive diffusion of cholic acid through cellulose membrane.	K28925
Caffeine	Adenosine Antagonist	Oral Human Adult Male	6 mg/kg	Active	Antagonist to adenosine resulting in an increase in noradrenaline and serotonin which is excitatory to spinal motor neurons, increasing the occurrence of self-sustained firing.	AB1033
Caffeine	Adenosine Antagonist	Not stated	Not stated	Active		AB1038
Theophylline	Adenosine Antagonist	Not stated	Not stated	Active	May ameliorate chest pain in those with hypersensitive esophagus by altering adenosine-mediated nociception.	AB1048

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E00552	INFLUENCE OF MATE DRINKING, HOT BEVERAGES AND DIET ON ESOPHAGEAL CANCER RISK IN SOUTH AMERICA. CASTELLSAGUE,X: NUNOZ,N: DE STEFANI,E: VICTORA,CG: CASTELLETTO,R: ROLON,PA: INT J CANCER 88 4: 658-664 (2000) (SERVEI D'EPIDEMIO REGISTER CAN INST CATALA D'ONCO BARCELONA SPAIN)
H15715	TRITERPENOID SAPONINS FROM ILEX PARAGUARIENSIS. GOSMANN,G: GUILLAUME,D: TAKETA,ATC: SCHENKEL,EP: J NAT PROD 58 3: 438-441 (1995) (LAB CHIM THERAP CNRS FAC SCI PHARM BIOL PARIS 75270 FRANCE)
H18558	MATESAPONIN 5, A HIGHLY POLAR SAPONIN FROM ILEX PARAGUARIENSIS. KRAEMER,KH: TAKETA,ATC: SCHENKEL,EP: GOSMANN,G: GUILLAUME,D: PHYTOCHEMISTRY 42 4: 1119-1122 (1996) (FAC FARM UNIV FED RIO GRANDE DO SUL PORTO ALEGRE 90610 BRAZIL)
J12777	LEAF ANTHOCYANINS OF ILEX PARAGUARIENSIS ST. HIL. RICCO,RA: WAGNER,ML: GIBERTI,G: GURNI,A: ACTA FARM BONAERENSE 14 2: 87-90 (1995) (FAC FARM BIOQUIM UNIV BUENOS AIRES BUENOS AIRES 1113 ARGENTINA)

J16175	MATE SUBSTITUTES OR ADULTERANTS: STUDY OF XANTHINE CONTENT. FILIP,R: LOPEZ,P: COUSSIO,J: FERRARO,G: PHYTOTHER RES 12 2: 129-131 (1998) (CATEDRA FARMACOG FAC FARMAC BIOQUIM UNIV BUENOS AIRES BUENOS AIRES ARGENTINA)
J16235	ANTIOXIDANT EFFECTS OF ILEX PARAGUARIENSIS: INDUCTION OF DECREASED OXIDABILITY OF HUMAN LDL IN VIVO. GUGLIUCCI,A: BIOCHEM BIOPHYS RES COMMUN 224 2: 338-344 (1996) (DEPT ANATOMY UNIV MONTREAL MONTREAL CANADA)
J16308	CAFFEINE, THEOBROMINE AND THEOPHYLLINE DISTRIBUTION IN ILEX PARAGUARYENSIS. MAZZAFERE,P: REV BRASIL FISIOL VEG 6 2: 149-151 (1994) (DEPT FISIOL VEG UNIV ESTADUAL CAMPINAS CAMPINAS BRAZIL)
J17002	MATE DRINKING: CAFFEINE AND PHENOLIC ACID INTAKE. MAZZAFERA,P: FOOD CHEM 60 1: 67-71 (1997) (DEP FISIOL VEGET INST BIOL UNIV ESTADUAL CAMPINAS CAMPINAS BRAZIL)
J18335	COFFEE, TEA, AND MATE. ANNON: LANCET 338 8769: 752-. (1991) (INTERNATIONAL AGEN RES CANCER)
J19977	EXCITATORY AND INHIBITORY EFFECTS OF PARAGUAYAN MEDICINAL PLANTS EQUISETUM GIGANTEUM, ACANTHOSPERMUM AUSTRALE, ALLOPYLUS EDULIS AND CORDIA SALICIFOLIA ON CONTRACTION OF RABBIT AORTA AND GUINEA-PIG LEFT ATRIUM. MATSUNAGA,K: SASAKI,S: OHIZUMI,Y: NATURAL MED 51 5: 478-481 (1997) (DEPT PHARM MOL BIOL FAC PHARMACEUTICAL SCI TOHOKU UNIV SENDAI 980-77 JAPAN)
K04641	HERBAL INTOXICATION. PSYCHOACTIVE EFFECTS FROM HERBAL CIGARETTES, TEA, AND CAPSULES. SIEGEL,RK: J AMER MED ASS 236 5: 473-476 (1976) (DEPT PHARMACOL SCH MED UNIV CALIFORNIA LOS ANGELES CA 90024 USA)
K09934	ANTIBACTERIAL ACTIVITY AGAINST STREPTOCOCCUS MUTANS OF MATE TEA FLAVOR COMPONENTS. KUBO,I: MUROI,H: HIMEJIMA,M: J AGR FOOD CHEM 41 1: 107-111 (1993) (DIV ENTOMOL PARASITOL COLL NAT RES UNIVERSITY CALIFORNIA BERKELEY CA 94720 USA)
K11173	INHIBITORY EFFECT OF EDIBLE PLANT EXTRACTS ON 12-O-TETRADECANOYLPHORBOL-13-ACETATE-INDUCED EAR OEDEMA IN MICE. YASUKAWA,K: YAMAGUCHI,A: ARITA,J: SAKURAI,S: IKEDA,A: TAKIDO,M: PHYTOTHER RES 7 2: 185-189 (1993) (COLL PHARM NIHON UNIV CHIBA 274 JAPAN)
K12102	FRESH LEAVES OF ILEX PARAGUARIENSIS ST. HILL. II. GENERAL CHEMICAL COMPOSITION OF EXTRACTION MEALS AS A FUNCTION OF DEGREE OF DEVELOPMENT (JUVENILE, INTERMEDIATE, AND MATURE) AND HARVEST DATE OF THREE CLONES. BERTONI,MH: VIGO,MS: GOMEZ,RG: KRICUN,SDP: KANZIG,RG: CATTANEO,P: AN ASOC QUIM ARGENT 80 1/3: 75-81 (1992) (DEPT QUIM ORG FAC CIENC EXACT & NAT UNIV BUENOS AIRES BUENOS AIRES 1428 ARGENTINA)
K18125	BIOLOGICAL SCREENING OF URUGUAYAN MEDICINAL PLANTS. GONZALEZ,A: FERREIRA,F: VAZQUEZ,A: MOYNA,P: PAZ,EA: J ETHNOPHARMACOL 39 3: 217-220 (1993) (CAT FARMACOG PROD NAT MONTEVIDEO URUGUAY)
K18283	PRELIMINARY STUDY OF CHINESE ANTICANCER DRUGS. SCHROEDER,E: AN PAUL MED CIR 105 1: 67-94 (1978) (HOSP SAO JOAQUIN DA REAL SAO PAULO BRAZIL)
K18723	LOW DENSITY LIPOPROTEIN OXIDATION IS INHIBITED BY EXTRACTS OF ILEX PARAGUARIENSIS. GUGLIUCCI,A: STAHL,AJC: BIOCHEM MOL BIOL INT 35 1: 47-56 (1995) (DEPT IMMUNOL IMMUNOPHARMCOL FAC PHARM UNIV LOUIS PASTEUR ILLKIRCH 6740 FRANCE)

K28925	INHIBITION OF THE PASSIVE DIFFUSION OF CHOLIC ACID BY THE ILEX PARAGUARIENSIS ST. HIL. SAPONINS. FERREIRA,F: VAZQUEZ,A: GUNTNER,C: MOYNA,P: PHYTOTHER RES 11 1: 79-81 (1997) (CATEDRA FARMACOGNOS PROD NATUR FAC QUIMICA MONTEVIDEO URUGUAY)
K29485	ANTIOXIDANT EFFECTS OF ILEX PARAGUARIENSIS: INDUCTION OF DECREASED OXIDABILITY OF HUMAN LDL IN VIVO. GUGLIUCCI,A: BIOCHEM BIOPHYS RES COMMUN 224 2: 338-344 (1996) (DEPT ANATOMY UNIV MONTREAL MONTREAL H3C 3J7 CANADA)
K29976	MUTAGENIC AND GENOTOXIC EFFECTS OF MATE (ILEX PARAGUARIENSIS) IN PROKARYOTIC ORGANISMS. LEITAO,AC: BRAGA,RS: BRAZ J MED BIOL RES 27 7: 1517-1525 (1994) (INST BIOFICISA CARLOS CHAGAS UNIV FED RIO DE JANEIRO RE DE JANIERO BRAZIL)
L00715	PHARMACOGNOSY: MEDICINAL TEAS-BOON OR BANE? DER MARDEROSIAN,AH: DRUG THER 1977 7: 178-186 (1977) (DEPT BIOL SCI PHILADELPHIA COLL PHARM SCI PHILADELPHIA PA USA)
L04728	EXTRACTION OF PURINE ALKALOIDS FROM MATE (ILEX PARAGUARIENSIS) USING SUPERCRITICAL CO2. SALDANA,MDA: MOHAMED,RS: BAER,MG: MAZZAFERA,P: J AGR FOOD CHEM 47 9: 3804-3808 (1999) (FAC CHEM ENG INST BIOL STATE UNIV CAMPINAS CAMPINAS BRAZIL)
L05460	ENDOTHELIUM-DEPENDENT VASORELAXING ACTIVITY OF AQUEOUS EXTRACTS OF ILEX PARAGUARIENSIS ON MESENTERIC ARTERIAL BED OF RATS. MUCCILLO BAISCH,AL: JOHNSTON,KB: PAGANINI STEIN,FL: J ETHNOPHARMACOL 60 2: 133-139 (1998) (DEPT CIENC FISIOLOG SETOR FARMACOL FUNDACAO UNIV RIO GRANDE RIO GRANDE BRAZIL)
L05756	THERMOGENIC EFFECTS OF COMMERCIALLY AVAILABLE PLANT PREPARATIONS AIMED AT TREATING HUMAN OBESITY. MARTINET,A: HOSTETMANN,K: SCHUTZ,Y: PHYTOMEDICINE 6 4: 231-238 (1999) (INST PHARMACOG & PHYTOCHEM SCH PHARM UNIV LAUSANNE LAUSANNE CH-1005 SWITZERLAND)
L07251	ANTIOXIDANT EFFECTS OF AN AQUEOUS EXTRACT OF ILEX PARAGUARIENSIS. SCHINELLA,GR: TROIANI,G: DAVILA,V: DE BUSCHIAZZO,PM: TOURNIER,HA: BIOCHEM BIOPHYS RES COMMUN 269 2: 357-360 (2000) (CATEDRA FARM FAC CIENC MED UNIV NACL LA PLATO BUENOS AIRES 1900 ARGENTINA)
L10422	METHYLXANTHINES OF ILEX PARAGUAIRENSIS A. ST.-HIL. VAR. VESTITA LOES. AND VAR. PARAGUARIENSIS. COELHO,GC: ATHAYDE,ML: SCHENKEL,EP: REV BRAS CIENC FARM 37 2: 153-158 (2001) (DEP BIOL QUIM UNIV IJUI IJUI BRAZIL)
L10990	METHOD FOR IDENTIFICATION AND DETERMINATION OF MATE LEAF ALKALOIDS IN HERBAL DIET TEA BY HIGH PERORMANCE LIQUID CHROMATOGRAPHY. SUR,SV: MAKARENKO,OG: GERASIMCHUK,TV: FARM ZH(KIEV) 2000 5: 64-68 (2000) (TSENTR LAB ANAL YAKOTSI LEK NAN UKRAINE)
L11790	INHIBITORY ACTION OF PARAGUAYAN MEDICINAL PLANTS ON 5-LIPOXYGENASE. MATSUNAGA,K: TAKAHASHI,A: OHIZUMI,Y: NATURAL MED 54 3: 151-154 (2000) (GRADUATE SCHOOL AGRI SCI TOHOKU UNIV SENDAI 981-8555 JAPAN)
L11901	ANTIOXIDANT ACTIVITY OF ILEX PARAGUARIENSIS AND RELATED SPECIES. FILIP,R: LOTITO,SB: FERRARO,G: FRAGA,CG: NUTR RES 20 10: 1437-1446 (2000) (PHARM PHYSIC CHEM SCH PHARM BIOCHEM UNIV BUENOS AIRES BUENOS AIRES ARGENTINA)

L13331	NMR AND LC-MS-N CHARACTERISATION OF TWO MINOR SAPONINS FROM ILEX PARAGUARIENSIS. MARTINE,A: NDJOKO,K: TERREAUX,C: MARSTON,A: HOSTETTMANN,K: SCHUTZ,Y: PHYTOCHEM ANAL 12 1: 48-52 (2001) (INST PHARMACOG & PHYTOCHEM SCH PHARM UNIV LAUSANNE LAUSANNE CH-1005 SWITZERLAND)
L14356	DISTRIBUTION OF FLAVONOID AGLYCONES IN ILEX SPECIES (AQUIFOLIACEAE). MARTINEZ,MADP: PELOTTO,JP: BASUALDO,N: BIOCHEM SYST ECOL 25 7: 619-622 (1997) (CEN ESTUD FARMACOL BOTAN CONSE NAC INVEST CIENT TECNI BUENOS AIRES ARGENTINA)
L14998	NONTOXIC, MUTAGENIC, AND CLASTOGENIC ACTIVITIES OF MATE-CHIMARRAO (ILEX PARAGUARIENSIS). FONSECA,CAS: OTTO,SS: PAUMGARTTEN,JR: LEITAO,AC: J ENVIRON PATHOL TOXICOL ONCOL 19 4: 333-346 (2000) (INST BIOFISCIA CAR CHAGAS FILH UNIV FED RIO DE JANEIRO RIO DE JANEIRO BRAZIL)
L17706	CAFFEINE AND THEOBROMINE IN EPICUTICULAR WAX OF ILEX PARAGUARIENSIS A. ST.-HIL. ATHAYDE,ML: COELHO,GC: SCHENKEL,EP: PHYTOCHEMISTRY 55 7: 853-857 (2000) (DEPT FARMACIA INDUSTRIAL UNIV FEDERAL SANTA MARIA SANTA MARIA 97100900 BRAZIL)
L20331	METHYLXANTHINES ACCUMULATION IN ILEX SPECIES-CAFFEINE AND THEOBROMINE IN ERVA-MATE (ILEX PARAGUARIENSIS) AND OTHER ILEX SPECIES. REGINATTO,FH: ATHAYDE,ML: GOSMANN,G: SCHENKEL,EP: J BRAZ CHEM SOC 10 6: 443-446 (1999) (FAC FARMACIA UNIV FED RIO GRANDE SUL PORTO ALEGRE BRAZIL)
L21204	PHENOLIC COMPOUNDS IN SEVEN SOUTH AMERICAN ILEX SPECIES. FILIP,R: LOPEZ,P: GIBERTI,G: COUSSIO,J: FERRARO,G: FITOTERAPIA 72 : 774-778 (2001) (CATEDRA FARMACOGNOSIA FACU FARMACIA BIOQUIMICA BUENOS ARGENTINA)
M10333	PURINE BASE PATTERN OF CAMELLIA IRRAWADIENSIS. NAGATA,T: SAKAI,S: PHYTOCHEMISTRY 24 10: 2271-2272 (1985) (DIV AGRONOMY NATL RES INST TEA SHIZUOKA 428 JAPAN)
M10672	STUDY ON THE PURINE CONTENT OF CAFFEINE CONTAINING DRUGS. I. MATE: ILEX PARAGUARIENTSIS LAMB. BALTASSAT,F: DARBOUR,N: FERRY,S: PLANT MED PHYTOTHER 18 4: 195-203 (1984) (LAB PHARMACOG FAC PHARM LYON 69373 FRANCE)
M14337	STUDIES ON MATE DRINKING. VAZQUEZ,A: MOYNA,P: J ETHNOPHARMACOL 18 3: 267-272 (1986) (CATEDRA FARMACOG & PROD NATUR FAC QUIM MONTEVIDEO 2124 URUGUAY)
M20926	QUANTITATIVE DETERMINATION AND DISTRIBUTION OF A CYANOGENIC GLUCOSIDE IN ILEX AQUIFOLIUM. WILLEMS,M: PLANTA MED 55 2: 195-. (1989) (INST PHARM BIOL JOHANN WOLFGANG GOETHE UNIV FRANKFURT D-6000 GERMANY)
M22370	A NEW SAPONIN FROM MATE, ILEX PARAGUARIENSIS. GOSMANN,G: SCHENKEL,EP: J NAT PROD 52 6: 1367-1370 (1989) (FACUL FARM UNIV FED RIO GRANDE DO SUL PORTO ALEGRE RS 90610 BRAZIL)
M22406	CHLOROGENIC ACIDS AND PURINE ALKALOIDS CONTENTS OF MATE (ILEX PARAGUARIENSIS) LEAF AND BEVERAGE. CLIFFORD,MN: RAMIREZ-MARTINEZ,JR:FOOD CHEM 35 1: 13-21 (1990) (DEPT BIOCHEM UNIV SURREY GUILDFORD GU2 5XH ENGLAND)
M30494	PATTERNS OF MATE DRINKING IN A BRAZILIAN CITY. VICTORA,CG: MUNOZ,N: HORTA,BL: RAMOS,EO: CANCER RES 50 22: 7112-7115 (1990) (DEPT MED SOCIAL UNIV FED PELOTAS PELOTAS BRAZIL)

T09507	ANTIVIRAL ACTIVITY OF AQUEOUS EXTRACTS FROM MEDICINAL PLANTS IN TISSUE CULTURES. MAY,G: WILLUHN,G: ARZNEIM-FORSCH 28 1: 1-7 (1978) (NO ADDRESS GIVEN)
T15375	A SURVEY OF PLANTS WITH ANTIFERTILITY PROPERTIES DESCRIBED IN THE SOUTH AMERICAN FOLK MEDICINE. GONZALEZ,F: SILVA,M: ABSTR PRINCESS CONGRESS I BANGKOK THAILAND 10-13 DECEMBER 1987 : 20PP-. (1987) (LAB QUIM PROD NAT UNIV CONCEPCION CONCEPCION CHILE)
T15449	DOUBLE-BLIND TRIAL OF HERBAL SLIMMING PILL. GEISSLER,C: HORTON,T: LANCET 1986 8504: 461-. (1986) (DEPT FOOD & NUT SCI KING COLL LONDON W8 7AH ENGLAND)
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AB1009	COMPARATIVE STUDY ON THE ANTIOXIDANT CAPACITY OF WINES AND OTHER PLANT-DERIVED BEVERAGES. ACTIS-GORETTA L: MACKENZIE, GG: OTEIZA, PI: FRAGA, CG: ANN N Y ACAD SCI 957: 279-83 (2002) (PHYSICAL CHEMISTRY-PRALIB, SCHOOL OF PHARMACY AND BIOCHEMISTRY, UNIVERSITY OF BUENOS AIRES, BUENOS AIRES, ARGENTINA.)
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AB1011	CHOLERETIC EFFECT AND INTESTINAL PROPULSION OF 'MATE' (ILEX PARAGUARIENSIS) AND ITS SUBSTITUTES OR ADULTERANTS. GORZALCZANY, S: FILIP, R: ALONSO, MR: MINO, J: FERRARO, GE: ACEVEDO, C: J ETHNOPHARMACOL 75 2-3: 291-4 (2001) (CATEDRA DE FARMACOLOGIA, FACULTAD DE FARMACIA Y BIOQUIMICA, JUNIN, BUENOS AIRES, ARGENTINA)
AB1012	DETERMINATION OF INORGANIC CATIONS BY CAPILLARY ION ELECTROPHORESIS IN ILEX PARAGUARIENSIS (ST. H.), A PLANT USED TO PREPARE TEA IN SOUTH AMERICA. CARDUCCI, CN: DABAS, PC: MUSE, JO: J AOAC INT 83 5: 1167-73 (2000) (UNIVERSITY OF BUENOS AIRES, FACULTY OF PHARMACY AND BIOCHEMISTRY, DEPARTMENT OF ANALYTICAL CHEMISTRY AND PHYSICOCHEMISTRY, ARGENTINA)
AB1013	MEAT INTAKE, 'MATE' DRINKING AND RENAL CELL CANCER IN URUGUAY: A CASE-CONTROL STUDY. DE STEFANI, E: FIERRO, L: MENDILAHARSU, M: RONCO, A: LARRINAGA, MT: BALBI, JC: ALONSO, S: DENEO-PELLEGRINI, H: BR J CANCER 78 9: 1239-43 (1998) (REGISTRO NACIONAL DE CANCER, MONTEVIDEO, URUGUAY)

AB1014	MINERALS CONTENT OF PARAGUAYAN YERBA MATE (ILEX PARAGUARIENSIS, S.H.). VERA GARCIA, R: BASUALDO, I: PERALTA, I: DE HEREBIA, M: CABALLERO, S: ARCH LATINOAM NUTR 47 1: 77-80 (1997) (DIRECCION DE INVESTIGACION, FACULTAD DE CIENCIAS QUIMICAS, UNIVERSIDAD NACIONAL DE ASUNCION, PARAGUAY.)
AB1015	MATE DRINKING AND RISK OF LUNG CANCER IN MALES: A CASE-CONTROL STUDY FROM URUGUAY. DE SSTEFANI, E: FIERRO, L: CORREA, P: FONTHAM, E: RONCO, A: LARRINAGA, M: BALBI, J: MENDILAHARSU, M: CANCER EPIDEMIOL BIOMARKERS PREV 5 7: 515-9 (1996) (REGISTRO NACIONAL DE CANCER, INSTITUTO NACTIONAL DE ONCOLOGIA, MONTEVIDEO, URUGUAY)
AB1016	MATE, COFFEE, AND TEA CONSUMPTION AND RISK OF CANCERS OF THE UPPER AERODIGESTIVE TRACT IN SOUTHERN BRAZIL. PINTOS, J: FRANCO, EL: OLIVEIRA, BV: KOWALSKI, LP: CURADO, MP: DEWAR, R: EPIDEMIOLOGY 5 6: 583-90 (1994) (DEPARTMENT OF EPIDEMIOLOGY, ARMAND-FRAPPIER INSTITUTE, GOIANIA, BRAZIL)
AB1017	BLACK TOBACCO, MATE AND BLADDER CANCER. A CASE-CONTROL STUDY FROM URUGUAY. DE STEFANI, E: CORREA, P: FIERRO, L: FONTHAM, E: CHEN, V: ZAVALA, D: CANCER 67 2: 536-40 (1991) (DEPARTMENT OF EPIDEMIOLOGY, INSTITUTO DE ONCOLOGIA, MONTEVIDEO, URUGUAY)
AB1018	BLACK TOBACCO, WINE AND MATE IN OROPHARYNGEAL CANCER. A CASE-CONTROL STUDY FROM URUGUAY. DE STEFANI, E: CORREA, P: OREGGIA, F: DENEO-PELLEGRINI, H: FERNANDEZ, G: ZAVALA, D: CARZOGLIO, J: LEIVA, J: FONTHAM, E: RIVERO, S: REV EPIDEMIOL SANTE PUBLIQUE 36 6: 389-94 (1988) (DEPARTMENT OF PATHOLOGY, UNIVERSITY HOSPITAL, LOUISIANA STATE UNIVERSITY, NEW ORLEANS)
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AB1020	FACTORS WHICH MODIFY THE NUTRITIONAL STATE OF IRON: TANNIN CONTENT OF HERBAL TEAS. PIZARRO, F: OLIVARES, M: HERTRAMPF, E: WALTER, T: ARCH LATINOAM NUTR 44 4: 277-80 (1994) (UNIDAD DE HEMATOLOGIA, UNIVERSIDAD DE CHILE, SANTIAGO)
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AB1022	TREATING DEPRESSION WITH ALCOHOL EXTRACTS OF TOBACCO. WILLIAMS, JR: ET AL. REGENT COURT TECHNOLOGIES. US PATENT #6,350,479 (2002)
AB1023	APPETITE SUPPRESSANT TOOTHPASTE. ZUCKERMAN, A: US PATENT #6,485,710 (2002)
AB1024	ANTIARTHRITIC MECHANISMS OF AMYRIN TRITERPENES. KWEIFIO-OKAI, G: DE MUNK, F: RUMBLE, BA: MACRIDES, TA; CROPLEY, M: RES COMMUN MOL PATHOL PHARMACOL 85 1: 45-55 (1994) (DEPARTMENT OF ANATOMY AND PHYSIOLOGY, ROYAL MELBOURNE INSTITUTE OF TECHNOLOGY, BUNDOORA, AUSTRALIA)
AB1025	ANTILIPOXYGENASE ACTIVITY OF AMYRIN TRITERPENES. KWEIFIO-OKAI, G: MACRIDES, TA: RES COMMUN CHEM PATHOL PHARMACOL 78 3: 367-72 (1992) (DEPARTMENT OF ANATOMY AND PHYSIOLOGY, ROYAL MELBOURNE INSTITUTE OF TECHNOLOGY, BUNDOORA, AUSTRALIA)

AB1026	INHIBITORY ACTIVITY OF THE WHITE WINE COMPOUNDS, TYROSOL AND CAFFEIC ACID, ON LIPOPOLYSACCHARIDE-INDUCED TUMOR NECROSIS FACTOR-ALPHA RELEASE IN HUMAN PERIPHERAL BLOOD MONONUCLEAR CELLS. GIOVANNINI, L: MIGLIORI, M: FILIPPI, C: ORIGLIA, N: PANICHI, V: FALCHI, M: BERTELLI, AA: BERTELLI, A: INT J TISSUE REACT 24 2: 53-6 (2002)(NEUROSCIENCE DEPARTMENT, UNIVERSITY OF PISA, ITALY)
AB1027	ROSMARINIC ACID AND CAFFEIC ACID PRODUCE ANTIDEPRESSIVE-LIKE EFFECT IN THE FORCED SWIMMING TEST IN MICE. TAKEDA, H: TSUJI, M: INAZU, M: EGASHIRA, T: MATSUMIYA, T: EUR J PHARMACOL 449 3: 261-7 (2002) (DEPARTMENT OF PHARMACOLOGY AND INTRACTABLE DISEASES RESEARCH CENTER (DIVISION OF DRUG RESEARCH AND DEVELOPMENT) TOKYO MEDICAL UNIVERSITY, SHINJUKU-KU, TOKYO, JAPAN)
AB1028	INHIBITORY EFFECTS OF TEA AND CAFFEINE ON UV-INDUCED CARCINOGENESIS: RELATIONSHIP TO ENHANCED APOPTOSIS AND DECREASED TISSUE FAT. CONNEY, AH: LU, YP: LOU, YR: HUANG, MT: EUR J CANCER PREV 11 SUPPL 2: S28-36 (2002) (SUSAN LEHMAN CULLMAN LABORATORY FOR CANCER RESEARCH, DEPARTMENT OF CHEMICAL BIOLOGY, COLLEGE OF PHARMACY, RUTGERS, THE STATE UNIVERSITY OF NEW JERSEY, NJ, USA)
AB1029	INHIBITION OF PROSTAGLANDIN BIOSYNTHESIS IN HUMAN ENDOTOXIN-STIMULATED PERIPHERAL BLOOD MONOCYTES: EFFECTS OF CAFFEINE. ULCAR, R: SCHULIGOI, R: HEINEMANN, A: SANTNER, B: AMANN, R: PAHRMACOLOGY. 67 2: 67-71 (2003) (INSTITUTE OF EXPERIMENTAL AND CLINICAL PHARMACOLOGY, UNIVERSITY OF CRAZ, AUSTRIA)
AB1030	CONSEQUENCES OF IN UTERO CAFFEINE EXPOSURE ON RESPIRATORY OUTPUT IN NORMOXIC AND HYPOXIC CONDITIONS AND RELATED CHANGES OF FOS EXPRESSION: A STUDY ON BRAINSTEM-SPINAL CORD PREPARATIONS ISOLATED FROM NEWBORN RATS. BODINEAU, L: CAYETANOT, F: SADANI-MAKKI, F: BACK, V: GROS, F: LEBLEU, A: COLLIN, T: FRUGIERE, A: PEDIATR RES 53 2: 266-73 (2003) (LABORATOIRE ENVIRONMENT TOXIQUE PERINATAL ET ADAPTATIONS PHYSIOLOGIQUES ET COMPORTEMENTALES, FACULTE DE MEDECINE, FRANCE)
AB1031	CAFFEINE INCREASES AORTIC STIFFNESS IN HYPERTENSIVE PATIENTS. VLACHOPOULOS, C: HIRATA, K: STEFANADIS, C: TOUTOUZAS, P: O'ROURKE, MF: AM J HYPERTENS 16 1: 63-6 (2003) (MEDICAL PROFESSORIAL UNIT, ST. VINCENT'S HOSPITAL AND CLINIC, UNIVERSITY OF NEW SOUTH WALES, SYDNEY, AUSTRALIA)
AB1032	TO DRINK OR NOT TO DRINK: HOW ARE ALCOHOL, CAFFEINE AND PAST SMOKING RELATED TO BONE MINERAL DENSITY IN ELDERLY WOMEN? ILICH, JZ: BROWNBILL, RA: TAMBORINI, L: CRNCEVIC-ORLIC, Z: J AM COLL NUTR 21 6: 536-44 (2002) (UNIVERSITY OF CONNECTICUT, SCHOOL OF ALLIED HEALTH, STORRS, CT)
AB1033	EFFECT OF CAFFEINE ON SELF-SUSTAINED FIRING IN HUMAN MOTOR UNITS. WALTON, C: KALMAR, JM: CAFARELLI, E: J PHYSIOL 545 (PT 2): 671-9 (2002) (KINESIOLOGY AND HEALTH SCIENCE, FACULTY OF PURE AND APPLIED SCIENCE, YORK UNIVERSITY, TORONTO, ON, CANADA)
AB1034	CONTRIBUTION OF CAFFEINE TO THE HOMOCYSTEINE-RAISING EFFECT OF COFFEE: A RANDOMIZED CONTROLLED TRIAL IN HUMANS. VERHOEF, P: PASMAN, WJ: VAN VLIET, T: URGERT, R: KATAN, MB: AM J CLIN NUTR 76 6: 1244-8 (2002) (WAGENINGEN CENTRE FOR FOOD SCIENCES, NUTRITION AND HEALTH PROGRAMME, WAGENINGEN, NETHERLANDS)

AB1035	EFFECTS OF SALBUTAMOL AND CAFFEINE INGESTION ON EXERCISE METABOLISM AND PERFORMANCE. COLLOMP, K: CANDAU, R: MILLET, G: MUCCI, P: BORRANI, F: PREFAUT, C: DE CEAURRIZ, J: INT J SPORTS MED 23 8: 549-54 (2002) (LABORATOIRE NATIONAL DE DEPISTAGE DU DOPAGE, CHATENAY-MALABRY, FRANCE)
AB1036	EFFECTS OF CAFFEINE, SLEEP LOSS, AND STRESS ON COGNITIVE PERFORMANCE AND MOOD DURING US NAVY SEAL TRAINING. LIEBERMAN, HR: THARION, WJ: SHUKITT-HALE, B: SPECKMAN, KL: TULLEY, R: PSYCHOPHARMACOLOGY (BERL) 164 3: 250-61 (2002) (MILITARY NUTRITION DIVISION, US ARMY RESEARCH INSTITUTE OF ENVIRONMENTAL MEDICINE, NATICK, MA, USA)
AB1037	EFFECTS OF CAFFEINE ON PERFORMANCE AND MOOD DEPEND ON THE LEVEL OF CAFFEINE ABSTINENCE. YEOMANS, MR: RIPLEY, T: DAVIES, LH RUSTED, JM: ROGERS, PJ: PSYCHOPHARMACOLOGY (BERL) 164 3: 241-9 (2002) (EXPERIMENTAL PSYCHOLOGY, UNIVERSITY OF SUSSEX, BRIGHTON, UK)
AB1038	EFFECTS OF CAFFEINE ON LEARNING AND MEMORY IN RATS TESTED IN THE MORRIS WATER MAZE. ANGELUCCI, ME: CES RIO C: HIROI, RH: ROSALEN, PL: CUNHA, CD: BRAZ J MED BIOL RES 35 10: 1201-8 (2002) (LABORAT RIO DE FISIOLOGIA E FARMACOLOGIA DO SISTEMA NERVOSO CENTRAL, DEPARTAMENTO DE FARMACOLOGIA, UNIVERSIDADE FEDERAL DO PARAN, CURITIBA, PR, BRASIL)
AB1039	EFFECTS OF CAFFEINE ON MOOD AND PERFORMANCE: A STUDY OF REALISTIC CONSUMPTION. BRICE, CF: SMITH, AP: PSYCHOPHARMACOLOGY (BERL) 164 2: 188-92 (2002) (CENTRE FOR OCCUPATIONAL AND HEALTH PSYCHOLOGY, SCHOOL OF PSYCHOLOGY, CARDIFF UNIVERSITY, PARK PLACE, CARDIFF, UK)
AB1040	CHLOROGENIC ACID MODIFIES PLASMA AND LIVER CONCENTRATIONS OF CHOLESTEROL, TRIACYLGLYCEROL AND MINERALS IN (FA/FA) ZUCKER RATS. RODRIQUEZ DE SOTILLO, DV: HADLEY, M: J NUTR BIOCHEM 13 12: 717-726 (2002) (HEALTH NUTRITION AND EXERCISE SCIENCE DEPARTMENT, EML, NORTH DAKOTA STATE UNIVERSITY, FARGO, ND, USA)
AB1041	INHIBITION OF CHLOROGENIC ACID-INDUCED CYTOTOXICITY BY COCL2. JIANG, Y: SATOH, K: WATANABE, S: KUSAMA, K SAKAGAMI, H: ANTICANCER RES 21 5: 3349-53 (2001) (DEPARTMENT OF DENTAL PHARMACOLOGY, MEIKAI UNIVERSITY SCHOOL OF DENTISTRY, SAKADO, SAITAMA, JAPAN)
AB1042	ASSESSMENT OF ESTROGENIC ACTIVITY IN SOME COMMON ESSENTIAL OIL CONSTITUENTS. HOWES, MJ: HOUGHTON, PJ: BARLOW, DJ: POCOCK, VJ: MILLIGAN, SR: J PHARM PHARMACOL 54 11: 1521-8 (2002) (DEPARTMENT OF PHARMACY, KINGS COLLEGE LONDON, FRANKLIN-WILKINS BUILDING, STAMFORD ST, LONDON, UK)
AB1043	BACTERICIDAL ACTIVITIES OF PLANT ESSENTIAL OILS AND SOME OF THEIR ISOLATED CONSTITUENTS AGAINST CAMPLYLOBACTER JEJUNI, ESCHERICHI COLI, LISTERIA MONOCYTOGENES AND SALMONELLA ENTERICA. FRIEDMAN, M: HENIKA, PR: MANDRELL, RE: J FOOD PROT 65 10: 1545-60 (2002) (WESTERN REGIONAL RESEARCH CENTER, AGRICULTURAL RESEARCH SERVICE, US DEPARTMENT OF AGRICULTURE, ALBANY, CALIFORNIA, USA)
AB1044	GERANIOL, A COMPONENT OF PLANT ESSENTIAL OILS, SENSITIZES HUMAN COLONIC CANCER CELLS TO 5-FLUOROURACIL TREATMENT. CARNESECCHI, S: LANGLEY, K: EXINGER, F: GOSSE, F: RAUL, F: J PAHRMACOL EXP THER 301 2: 625-30 (2002) (LABORATORY OF CANCER NUTRITIONAL PREVENTION, INSTITUT DE RECHERCHE CONTRE LES CANCERS DE L'APPAREIL DIGESTIF, STRASBOURG, FRANCE)

AB1045	GERANIOL, A COMPONENT OF PLANT ESSENTIAL OILS, INHIBITS GROWTH AND POLYAMINE BIOSYNTHESIS IN HUMAN COLON CANCER CELLS. CARNESECCHI, S: SCHNEIDER, Y: CERALINE, J: DURANTON, B: GOSSE, F: SEILER, N: RAUL, F: J PHARMACOL EXP THER 298 1: 197-200 (2001) (LABORATORY OF NUTRITIONAL CHEMOPREVENTION IN DIGESTIVE ONCOLOGY, INSTITU DE RECHERCHE CONTRE LES CANCERS DE L'APPAREIL DIGESTIF, STRASBOURG, FRANCE)
AB1046	NTP TOXICOLOGY AND CARCINOGENESIS STUDIES OF THEOPHYLLINE (CAS NO. 58-55-9) IN F344/N RATS AND B6C3F1 MICE (FEED AND GAVAGE STUDIES). NATIONAL TOXICOLOGY PROGRAM. NATL TOXICOL PROGRAM TECH REP SER 478: 1-326 (1998)
AB1047	ORAL THEOPHYLLINE FOR CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COCHRANE REVIEW). RAM, FS: JONES, PW: CASTRO, AA: DE BRITO, JA: ATALLAH, AN: LACASSE, Y: MAZZINI, R: GOLDSTEIN, R: CENDON, S: COCHRANE DATABASE SYST REV 4: CD003902 (2002) (DEPT OF PHYSIOLOGICAL MEDICINE, ST GEORGE'S HOSPITAL MEDICAL SCHOOL, LEVEL O, JENNER WING, CRANMER TERRACE, LONDON, UK)
AB1048	AN OPEN-LABEL TRIAL OF THEOPHYLLINE FOR FUNCTIONAL CHEST PAIN. RAO, SS: MUDIPALLI, RS: MUJICA, V: UTECH, CL: ZHAO, X: CONKLIN, JL: DIG DIS CI 47 12: 2763-8 (2002) (DEPT OF INTERNAL MEDICINE, UNIVERSITY OF IOWA COLLEGE OF MEDICINE, IOWA CITY, IOWA, USA)
AB1049	URSOLIC ACID AS A TRYPANOCIDAL CONSTITUENT IN ROSEMARY. ABE, F: YAMAUCHI, T: NAGAO, T: KINJO, J: OKABE, H: HIGO, H: AKAHANE, H: BIOL PHARM BULL 25 11: 1485-7 (2002) (FACULTY OF PHARMACEUTICAL SCIENCES, FUKUOKA, UNIVERSITY, FUKUOKA, JAPAN)
AB1050	EXPERIMENTAL STUDY ON APOPTOSIS INDUCED BY URSOLIC ACID ISOLATED FROM ASPARAGUS IN HL-60 CELLS. HUANG, J: SUN, Y: LU, S: ZHONGGUO ZHONG XI YI JIE HE ZA ZHI 19 5: 296-8 (1999) (CANCER HOSPITAL AND INSTITUTE, PEKING UNION MEDICAL UNIVERSITY, CHINESE ACADEMY OF MEDICAL SCIENCES, BEIJIN)
AB1051	URSOLIC ACID ENHANCES NITRIC OXIDE AND TUMOR NECROSIS FACTOR-ALPHA PRODUCTION VIA NUCLEAR FACTOR-KAPPAB ACTIVATION IN THE RESTING MACROPHAGES. YOU, HJ: CHOI, CY: KIM, JY; PARK, SJ: HAHM, KS: JEONG, HG: FEBS LETT 509 2: 156-60 (2001) (DEPT OF PHARMACY, COLLEGE OF PHARMACY, CHOSUN UNIVERSITY, KWANGJU, SOUTH KOREA)
AB1052	URSOLIC ACID: AN ANTI-TUMORIGENIC AND CHEMOPREVENTIVE ACTIVITY. MINIREVIEW. NOVOTNY, L: VACHALKOVA, A: BIGGS, D: NEOPLASMA 48 4: 241-6 (2001) (FACULTY OF PHARMACY, HEALTH SCIENCE CENTER, KUWAIT UNIVERSITY, SAFAT)
AB1053	TOPICAL ANTI-INFLAMMATORY ACTIVITY OF SALVIA OFFICINALIS L. LEAVES; THE RELEVANCE OF URSOLIC ACID. BARICEVIC, D: SOSA, S: DELLA LOGGIA R: TUBARO, A: SIMONOVSKA, B: KRASNA, A: ZUPANCIC, A: J ETHNOPHARMACOL 75 2-3: 125-32 (2001) (AGRONOMY DEPT, BIOTECHNICAL FACULTY, UNIVERSITY OF LJUBLJANA, LJUBLJANA, SLOVENIA)
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